

**REMARKS****I. Introduction**

Applicants wish to thank the Examiner for the telephonic interview conducted on April 13, 2004. In response to the Office Action mailed April 7, 2004, Applicants have canceled claim 2, without prejudice or disclaimer. Applicants have amended claims 1-14 and 26-28 in the manner suggested by the Examiner for overcoming the rejection under 35 U.S.C. § 112, first paragraph. Applicants have also amended claim 6 so as to address the rejection under 35 U.S.C. § 112, second paragraph. No new matter has been added.

**Further, Applicants note that the IDS disclosure filed on March 16, 2004 has not been considered. It is respectfully requested that the foregoing document be expressly considered during the prosecution of this application, and that the document be made of record therein. A copy of the IDS disclosure previously submitted is attached hereto. A returned signed form PTO-1449 to the Applicants is respectfully requested.**

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

**II. The Rejection Of The Claims Under 35 U.S.C. § 112, First Paragraph**

Claims 1-14 are rejected under 35 U.S.C. § 112, first paragraph, for failing to provide enablement for broadly drying every type of material.

In response to the foregoing rejections, the preamble of the claims have been rewritten with the phrase “method of drying a circuit board material” in an effort to clarify the subject matter of the present invention. It is respectfully submitted that the

foregoing amendment overcomes the pending rejection under 35 U.S.C. § 112, first paragraph.

**III. The Rejection Of The Claims Under 35 U.S.C. § 112, Second Paragraph**

Claim 6 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As suggested by the Examiner in the pending Office Action, Applicants have amended claim 6 so as to recite that “the air pressure of said hot air of a subsequent evacuating step is lower than the air pressure of said hot air of the previous evacuating step.” As such, it is respectfully submitted that claim 6 is compliant with the requirements under 35 U.S.C. § 112, second paragraph.

**IV. The Rejection Of Claims 1 and 9 Under 35 U.S.C. § 102(b)**

Claims 1 and 9 are rejected under 35 U.S.C. § 102(b) as being anticipated by JP Pub. No. 61-055372 to Sakuma. Applicants respectfully submit that the claims are patentable over the cited prior art for at least the following reasons.

In accordance with one embodiment of the present invention, claim 1 relates to drying a circuit board material comprising the steps of: 1) evacuating air in a vacuum chamber under an atmospheric pressure to a predefined pressure, 2) supplying air to said vacuum chamber to return the pressure in said chamber to the atmospheric pressure, and 3) wherein said evacuating and supplying steps are performed more than once, and the predefined pressure of a subsequent evacuating step is lower than the predefined pressure of the previous evacuating step. The foregoing method provides, for example, a clean

and highly reliable board material by efficiently drying the moisture absorbed by the board material, without damaging the board material after the removal of water drops that have adhered to the surface of the board material during the cleaning process.

Turning to the cited prior art, this concept is not recognized or disclosed in the Sakuma reference. Indeed, nowhere does Sakuma disclose or suggest “a predefined pressure” or “return the pressure in said chamber to atmospheric pressure,” in the manner asserted by the Examiner. Neither does Sakuma disclose or suggest that the evacuating and supplying steps are performed more than once, and the predefined pressure of a subsequent evacuating step is lower than the predefined pressure of the previous evacuating step, as recited by amended claim 1.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and, at a minimum, Sakuma does not disclose or suggest the foregoing limitations, it is clear that Sakuma does not anticipate amended claim 1, or any claim dependent thereon.

#### V. The Rejection Of Claims 1, 5, 8, 10 and 13 Under 35 U.S.C. § 102(b)

Claims 1, 5, 8, 10 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by USP No. 5,732,478 to Chapman. Applicants respectfully submit that the claims are patentable over the cited prior art for at least the following reasons.

As discussed above, the present invention comprises the steps of evacuating air at an atmospheric pressure to a predefined pressure, and supplying air to return the pressure

to the atmospheric pressure, wherein said evacuating and supplying steps are performed more than once.

Turning to the cited prior art, as readily shown in Fig. 2, the vacuum pump 38 operates when air knives 34 and 35 shut off, reducing the pressure within the chamber 21 to about one kPa. Specifically, the semiconductor devices 24 and 25 were subjected to warm air for approximately 30 minutes, as indicated at 53 of Fig. 4, and then subjected to vacuum for a period of 30 minutes, as indicated at 51 of Fig. 4. This process of heating and low pressure is alternated repeatedly so that the residual moisture in the devices within the chamber 21 is vaporized (see, col. 3, lines 28-38).

However, nowhere does Chapman disclose or suggest that the chamber returns from one kPa to the original atmospheric pressure. Indeed, Chapman does not even mention or recognize any atmospheric pressure. Thus, at a minimum, Chapman does not disclose or suggest that “the predefined pressure returns to the atmospheric pressure,” or “said evacuating and supplying steps are performed more than once, and the predefined pressure of a subsequent evacuating step is lower than the predefined pressure of the previous evacuating step,” as recited by claim 1. Chapman does not appear to disclose or suggest that the material is heated by microwave heating. Thus, at a minimum, Chapman does not disclose or suggest that the material is heated by one of a radiation heat from a heater and a heating by microwave, as recited by amended claim 13.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and, at a minimum, Chapman does not disclose or suggest the

foregoing limitation, it is clear that Chapman does not anticipate amended claim 1, or any claim dependent thereon.

**VI. The Rejection Of Claims 1, 5 and 13 Under 35 U.S.C. § 102(b)**

Claims 1, 5 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by USP No. 4,893,415 to Moldrup. Applicants respectfully submit that the claims are patentable over the cited prior art for at least the following reasons.

Specifically, Moldrup discloses that the wood is heated by circulating hot air in the drying chamber during the heating phase. The heat, which is applied during the heating phase, is utilized during the evacuation phase for evaporation of water from the wood by establishing a vacuum in the drying chamber. During the evacuation phase, no heat is applied to the wood, and the wood gradually cools down as that the heat which is applied during the heating phase is used in the evaporation of water.

Thus, Moldrup discloses a process for drying wood in which the heating and evaporation phases are repeated a number of times. However, nowhere does Moldrup disclose or suggest “evacuating air under an atmospheric pressure to a predefined pressure,” “supplying air to return the pressure to the atmospheric pressure,” or “said evacuating and supplying steps are performed more than once, and the predefined pressure of a subsequent evacuating step is lower than the predefined pressure of the previous evacuating step,” as currently recited by claim 1. Indeed, Moldrup does not appear to disclose or suggest any “predefined pressure” or “atmospheric pressure.” As such, it is clear that the method of Moldrup is different from the method used in the present invention. Further, Moldrup does not appear to disclose or suggest that the material is heated by microwave heating. Thus, at a minimum, Moldrup does not

disclose or suggest that the material is heated by one of a radiation heat from a heater and a heating by microwave, as recited by amended claim 13.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and, at a minimum, Moldrup does not disclose or suggest the foregoing limitation, it is clear that Moldrup does not anticipate amended claim 1, or any claim dependent thereon.

## **VII. The Rejection Of Claims 26-35 Under 35 U.S.C. § 103(a)**

Claims 26-35 are rejected under 35 U.S.C. 103(a) as being unpatentable by Applicants' admitted prior art (AAPA) in view of Sakuma or Chapman. Applicants respectfully submit that the claims are patentable over the cited prior art for at least the following reasons.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the *claimed invention* where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *Ecolchem Inc. v. Southern California Edison Co.*, 227 F.3d 1361, 56 U.S.P.Q.2d (BNA) 1065 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 999, 50 U.S.P.Q.2D (BNA) 1614, 1617 (Fed. Cir. 1999); *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992). See also **M.P.E.P § 2143.01**.

Neither the AAPA, Sakuma nor Chapman, taken alone or in combination, disclose or suggest the combination of elements of claims 26-28 as a whole, including at least the

drying steps of “evacuating air in a vacuum chamber under an atmospheric pressure to a predefined pressure,” “supplying air to return the pressure in said chamber to the atmospheric pressure,” or “said evacuating and supplying steps are performed more than once, and the predefined pressure of a subsequent evacuating step is lower than the predefined pressure of the previous evacuating step.” Indeed, neither does the AAPA, Sakuma nor Chapman, taken alone or in combination, disclose or suggest “cleaning said board material to remove at least one of altered parts and altered substances formed on an inner wall,” or “forming an electrical connection means on one of said through hole and said blind hole,” as recited by claim 26, “filing one of said through hole and said blind hole with conductive paste,” “drying a double-sided circuit board having circuit patterns on both surfaces thereof,” or “laminating said double-sided circuit board and said board material to form a multi-layer circuit board, said board material being filled with said conductive paste and said film-shape materials on the both sides of said board material being peeled off,” as recited by claim 27, “bonding a board material to at least one surface,” “laminating said circuit board and said board material by further bonding a metal foil on said board material, and heating and pressing said circuit board and said board material at the same time,” or “forming a means for electrically connecting said circuit board and said metal foil,” as recited by claim 28.

Thus, as each and every limitation must be either disclosed or suggested by the cited prior art in order to establish a *prima facie* case of obviousness (see, **M.P.E.P. § 2143.03**), and the combination of the AAPA and Sakuma or Chapman fails to do so, it is respectfully submitted that claims 26-28 are patentable over the prior art.

**VIII. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable**

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1 and 26-28 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

Moreover, with regard to claims 29-35, it is improper to simply conclude that the AAPA can be modified by Sakuma or Chapman “because they are notoriously well-known and conventional materials.” The rejection must provide a cogent **technological reason why** one having ordinary skill in the art would have been realistically motivated to proceed **against** the expressed conventional drying method of the AAPA to employ “a prepregnated material, said prepregnated material being made by impregnating a reinforcing material with a thermosetting resin and making the resin into B stage,” as recited by claim 29, “said reinforcing material is one of a glass fiber fabric and a glass fiber non-woven fabric,” as recited by claim 30, “said reinforcing material is one of an aromatic polyamide fiber fabric and an aromatic polyamide fiber non-woven fabric,” as recited by claim 31, “that forming an electrical connection means is a method of filling said hole with paste containing conductive particles,” as recited by claim 32, “that forming an electrical connection means is a method of forming a plating layer on an inner wall of said hole,” as recited by claim 33, “that one of said board material and said circuit board is dried under a state of stacking sheets of one of said board material and said



circuit board one on top of another, as recited by claim 34, or “that said film-shape material is coated with a thermosetting epoxy resin on a surface,” as recited by claim 35.

Indeed, the combination of the AAPA and Sakuma or Chapman does not appear to disclose or suggest any of the foregoing claim elements. As such, claims 29-35 are patentable over the cited prior art references.

For all of the foregoing reasons, it is submitted that claims 2-14 and 29-35 are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections of claims 1-14 and 26-35 under 35 U.S.C. § 103 be withdrawn.

**IX. Conclusion**

Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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